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Recent 100 TeraWatt K-α Experiments at LLNL: Hot Electron Production for the Fast Ignitor*

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The results of a series of laser-solid experiments at ultra-high irradiances will be discussed. The laser intensity was measured to be as high as $Il^2 = 5x10^{19}$ W.mm/cm^2. This light was focused onto various materials, such as plastic, molybdenum, and aluminum. Each target was backed with a 50 mm layer of either Mo or Sn, capable of producing a strong K-a signal. By varying the target thickness from between 100-1000 mm, a hot electron spectra was inferred by comparing the experimentally measured K-a yield with that obtained by using the ITS code. The ITS code uses Monte Carlo electron and photon transport algorithms to track electrons and photons through solid materials. However, LASNEX simulations of similar parameters predicts that a large potential develops between the front edge of the target, and the back K-a emitting layer. It is found that this potential is necessary for a consistent explanation of the experimental results using ITS as well.

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